REMARKS

Reconsideration of the application, in light of the above amendments, is respectfully requested.

I.   Status of the Claims

Claims 1-5 are pending. Claims 1 and 5 have been amended to address formalities. No new matter is added.

II.   Rejections under 35 U.S.C. § 103

Claims 1-5 are rejected under 35 U.S.C. § 103(a) as anticipated by Tanida et al., "Compact Image Capturing System Based On Compound Imaging And Digital Reconstruction" (hereinafter "Tanida") in view of Tanida et al., "Thin observation module by bound objects (TOMBO)" (hereinafter "Tanida 2000"). Applicants respectfully traverse the rejection of claims 1 – 5 under 35 U.S.C. § 103(a).

Tanida discloses a compact image capturing system using compound-eye imaging optics in to provide a very thin system configuration (see, e.g., page 1, section 1., paragraph 2 of Tanida).The system of Tanida includes a micro lens array having a plurality of micro lenses, and operating to configure a single object image based on image data from the individual lens elements (see, e.g., page 5, section 4.3, paragraph 1 of Tanida).

The Examiner acknowledges that Tanida fails to teach the following elements of independent claim 1:

1. an object image configuring apparatus having micro lens and light receiving elements that are set without alignment error,

2. previously obtaining a geometric transfer function T_k describing optical projection from the said real object to create said reduced image element and inverse transfer function T_k^{-1},

3. a generating means of initial object image for generating an initial image data of a single object image based on an image data of a plurality of said reduced object images captured by said micro lens array under said known condition using said inverse transfer function T_k^{-1};

4. a reduced image estimating means for estimating an estimated image of each of said reduced object images from an image data of a provided single object image which comes from said generating means of initial object image, based on a geometric projection process where said transfer function T_k is used, and

5. an object image updating means for updating an image data of said single object image provided in said reduced image estimating means by projecting a difference between said estimated image of each reduced object images which comes from said reduced image estimating means and each of said reduced object images which is captured under said known condition of micro lens array, using said inverse process T_k^{-1} of said geometric projection process.

The Examiner suggests however that these deficiencies are overcome with the addition of Tanida 2000. Applicants respectfully disagree, for the following reasons:

1. *an object image configuring apparatus having micro lens and light receiving elements that are set without alignment error* – the Examiner alleges that this element is disclosed at page 1031, line 28 through page 1032, line 1 of Tanida 2000, which discloses a "special lens holder" for "precise adjustment of the components," and more specifically, for setting "a small back focus *a* in the alignment," where *a* represents a back focus of the micro lens. Ideally, *a* is set up as a distance between the light receiving elements and the lens holder (see, e.g. FIG. 3 of Tanida 2000). However, and in contrast to Applicants' claimed invention, Tanida 2000 does not anywhere in addition allege that the lens holder eliminates or is otherwise adjusted to eliminate alignment error. In fact, Tanida 2000 acknowledges that misalignments are present (see, e.g., page 1034, section 5, paragraph 1 of Tanida 2000). Because it is

6

clearly possible that the lens holder of Tanida 2000 does not provide a mechanism for setting the individual micro lenses and light receiving elements without alignment error, this feature without direct evidence cannot be presumed (see, e.g., MPEP § 2112, citing *In re Robertson*, 169 F.3d 743, 745, 49 USPQ2d 1949, 1950-51 (Fed. Cir. 1999) (citations omitted)).

2. *previously obtaining a geometric transfer function T_k describing optical projection from the said real object to create said reduced image element and inverse transfer function T_k^{-1}* – the Examiner alleges that this element is disclosed by Tanida 2000 at page 1033, lines 18 – 22. This passage discloses a system matrix H and pseudoinverse matrix H^+. In the Description of the Related Art at page 2, line 20 through page 3, line 1 of the present application, Applicants describe matrices of Tanida 2000 as follows:[1]

> The sampling method is for reconfiguring a single object image by superposing reduced object images <u>basing their centroid positions</u>. The pseudo inverse method is firstly for indicating the object as a photogenic subject and the reduced object images by vectors, and <u>describing a point spread function of optical system by matrix</u>. It then for reconfiguring a single object image by calculating the inverse matrix of the point spread function mathematically (emphasis added).

Thus, unlike Applicants' invention as claimed in independent claim 1, the matrices H, H^+ of Tanida 2000 are used to characterize a <u>point spread function</u> by overlapping object images aligned according to determined centroid positions, rather than characterizing the images according to the claimed <u>geometric transfer function</u> (as characterized by Applicants' claimed matrices T_k, T_k^{-1}).

3. *a generating means of initial object image for generating an initial image data of a single object image based on an image data of a plurality of said reduced object images captured by said micro lens array under said known condition using said inverse transfer function T_k^{-1}* – the Examiner alleges that this element is disclosed by Tanida 2000 at page 1034, lines 14 – 17, describing "the back projection method ...

---

[1] One of Applicants (Jun Tanida) is a co-author of Tanida 2000.

using the matrices H and H^+." However, as described above, the matrix H^+ of Tanida 2000 is <u>not</u> equivalent to Applicants' claimed <u>geometric transfer function</u> matrices T_k, T_k^{-1}.

4. *a reduced image estimating means for estimating an estimated image of each of said reduced object images from an image data of a provided single object image which comes from said generating means of initial object image, based on a geometric projection process where said transfer function T_k is used* - the Examiner alleges that this element is disclosed by Tanida 2000 at page 1033, lines 18 – 25, describing the system matrix H. However, as argued above, the matrix H of Tanida 2000 is <u>not</u> equivalent to Applicants' claimed geometric transfer function T_k.

5. *an object image updating means for updating an image data of said single object image provided in said reduced image estimating means by projecting a difference between said estimated image of each reduced object images which comes from said reduced image estimating means and each of said reduced object images which is captured under said known condition of micro lens array, using said inverse process T_k^{-1} of said geometric projection process* - the Examiner alleges that this element is disclosed by Tanida 2000 at page 1034, lines 8 – 13, describing "the back projection method ... using the matrices H and H^+." However, as described above, the matrix H^+ of Tanida 2000 is <u>not</u> equivalent to the Applicants' claimed inverse geometric transfer function T_k^{-1}

For at least the above-argued reasons, Applicants respectfully submit that independent claim 1 is not made obvious by the combination of Tanida and Tanida 2000, and stands in condition for allowance. As claims 2 – 4 each depend either directly or indirectly from allowable independent claim 1, Applicants further submit that dependent claims 2 – 4 are also allowable for at least this reason. As independent claim 5 substantially includes each of the elements of allowable claim 1 argued above as distinguishing the claimed invention over the cited references, Applicants also submit that independent claim 5 is also allowable for at least this reason.

Therefore, Applicants respectfully request that the rejection of claims 1 – 5 under 35 U.S.C. § 103(a) be withdrawn.
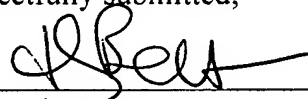
CONCLUSION

In view of the above amendments and remarks, Applicants believe the pending application and all pending claims are in condition for allowance, and earnestly solicit same.

If the Examiner feels that any remaining issues can be resolved by a Supplemental or an Examiner's Amendment, the Examiner is respectfully requested to contact the undersigned at the telephone number indicated below.

Dated: September 17, 2009   Respectfully submitted,

                                               By_____
                                               Thomas J. Bean
                                                  Registration No.: 44,528
                                               DARBY & DARBY P.C.
                                               P.O. Box 770
                                               Church Street Station
                                               New York, New York 10008-0770
                                               (212) 527-7700
                                               (212) 527-7701 (Fax)
                                               Attorneys/Agents For Applicant

4470569.1 0204589-US0